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Supporting Information

Fabrication of Free-standing Al_2O_3 Nanosheets for High Mobility Flexible Graphene Field Effect Transistors

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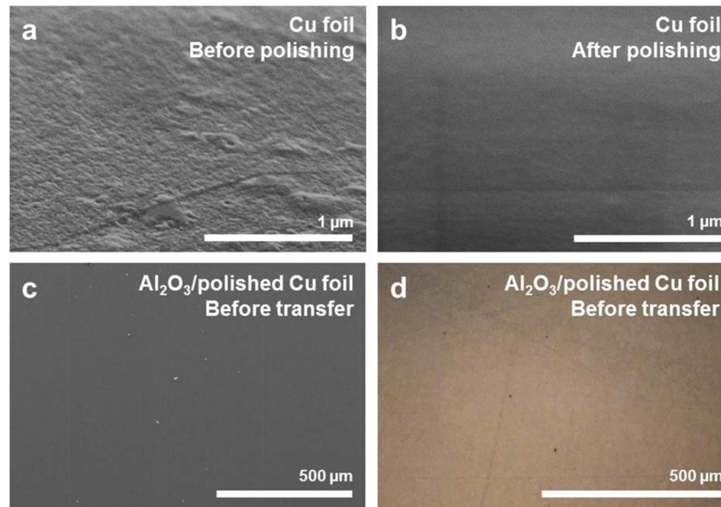

Figure S1. Representative SEM images of Cu foils (a) before and (b) after a chemical-mechanical polishing met hod. SEM image (c) and optical microscope image (d) of the Al_2O_3 on polished Cu foils.

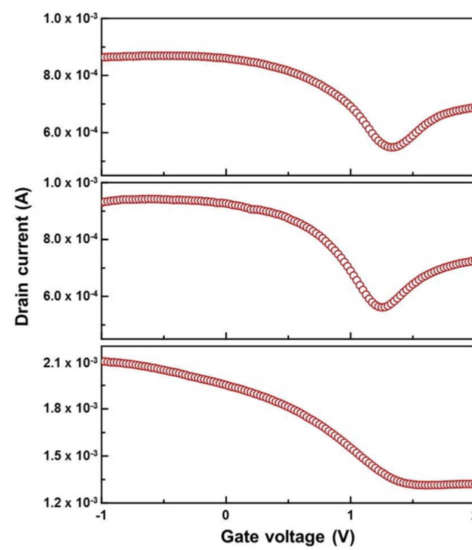

Figure S2. Transfer characteristics of top-gated GFETs with Al_2O_3 gate dielectrics prepared by PMMA-assisted wet transfer.

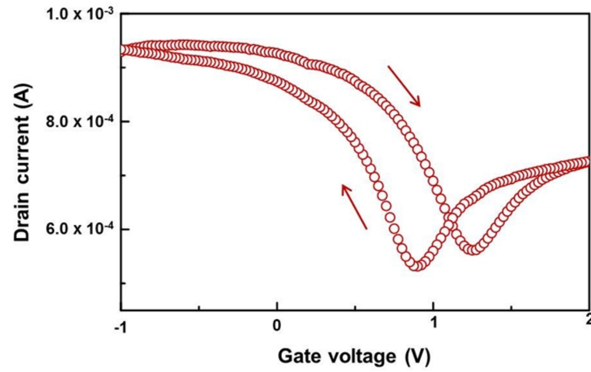

Figure S3. Gate hysteresis behavior of top-gated GFETs with Al_2O_3 gate dielectrics prepared by PMMA-assiste d wet transfer.

Bending tests and measurement of electrical properties

A uniaxial stretch machine was used for strain test of 100 nm-thick Al_2O_3 layer on the PET substrate (thickness: 80 μm). Here, an Al_2O_3 thin film is hold by the fixed stage (Figure S4). The resistance of thin film was measure d using probe tips for silver paste electrodes under the various strains. Electrical characteristics were measured u sing a probe station and semiconductor analyzer (Keithley 4200).

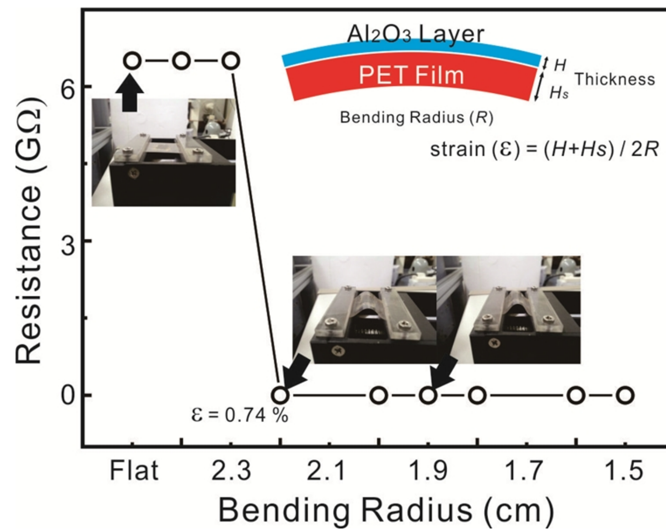

Figure S4. Bending tests and measurement of electrical resistance of Al_2O_3 layer on the PET film.

	Top-gated GFET (transferred Al_2O_3)	Top-gated GFET (ALD)	Bottom-gated GFET
Hole mobility ($cm^2/V\cdot s$)	2308.28±295.53	15.28	286.40
Electron mobility ($cm^2/V\cdot s$)	1615.66±404.04	23.36	210.36
On/Off	1.66	1.12	1.03

Table S1. Device performances of the GFETs with top- and bottom-gated configurations.